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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,044

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Shigehiro Matsuno

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EXAMINER

EDWARDS, LOREN C

ART UNIT

PAPER NUMBER

3748

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/591,044	Applicant(s) MATSUNO ET AL.	
	Examiner LOREN C. EDWARDS	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10-12, 14, 15, 17, 18, 20-24, 26, 27, 33-35, 37, 39 and 41-43 is/are rejected.
- 7) ☒ Claim(s) 5-9, 13, 16, 19, 25, 28-32, 36, 38 and 40 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/29/06, 5/27/08</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 8/29/06 and 5/27/08 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 10-12, 14, 15, 20-22, 26, 27, 35, 37, 39, and 43 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ono et al. (U.S. 6,438,948). Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification portion (Fig. 9, No. 6 – upstream end) and a downstream purification portion (Fig. 9, No. 6 – downstream end), the regeneration controller comprising: a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure, between a first location upstream from the exhaust purification apparatus (Fig. 9, No. 35) and a second

location downstream from the exhaust purification apparatus (Fig. 9, No. 36), and a difference in exhaust temperature, between a third location upstream from the downstream purification portion of the exhaust purification apparatus and a fourth location downstream from the third location; a calculation section for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus (Claims 1 and 14); a heating control section for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than a reference accumulation amount (Claim 11 – regeneration treatment); and a replacement control section for replacing the estimated accumulation amount with a greater estimated accumulation amount when the estimated accumulation amount falls within a replacement determination reference range due to the heating and the at least one difference is greater than a replacement reference value (Claim 11).

5. With regards to claim 2, Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification mechanism (Fig. 9, No. 6 – upstream end) and a downstream purification mechanism (Fig. 9, No. 6 – downstream end) that are arranged in the exhaust passage, the regeneration controller comprising: a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure and a difference in exhaust temperature between an upstream location (Fig. 9, No. 35) and a downstream location (Fig. 9, No. 36) of the downstream purification mechanism; a calculation section

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(Claims 1 and 14) for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus; a heating control section (Claim 11 – regeneration treatment) for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than a reference accumulation amount; and a replacement control section (Claim 11) for replacing the estimated accumulation amount with a greater estimated accumulation amount when the estimated accumulation amount falls within a replacement determination reference range due to the heating and the at least one difference is greater than a replacement reference value.

6. With regards to claim 3, Ono discloses the regeneration controller of claim 1, as described above, and further wherein the replacement determination reference range includes a value equal to the accumulation amount of particulate matter in the exhaust purification apparatus immediately before the heating is completed (Claim 11 – immediately after and immediately before are the same point in time).

7. With regards to claim 4, Ono discloses the regeneration controller of claim 1, as described above, and further wherein a maximum value of the replacement determination reference range is equal to the accumulation amount of particulate matter in the exhaust purification apparatus when the heating is completed (Claim 11).

8. With regards to claim 10, Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification portion (Fig. 9, No. 6 – upstream end) and

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a downstream purification portion (Fig. 9, No. 6 – downstream end), the regeneration controller comprising: a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure, between a first location upstream from the exhaust purification apparatus (Fig. 9, No. 35) and a second location downstream from the exhaust purification apparatus (Fig. 9, No. 36), and a difference in exhaust temperature, between a third location upstream from the downstream purification portion of the exhaust purification apparatus and a fourth location downstream from the third location; a calculation section (Claims 1 and 14) for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus; a heating control section (Claim 11 – regeneration treatment) for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than a reference accumulation amount; and a hold control section (Claim 11) for holding the estimated accumulation amount when the estimated accumulation amount falls within a hold determination reference range due to the heating and the at least one difference is greater than a held reference value.

9. With regards to claim 11, Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification mechanism (Fig. 9, No. 6 – upstream end) and a downstream purification mechanism (Fig. 9, No. 6 – downstream end) that are arranged continuously in the exhaust passage, the regeneration controller comprising:

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a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure and a difference in exhaust temperature between an upstream location (Fig. 9, No. 35) and a downstream location (Fig. 9, No. 36) of the downstream purification mechanism; a calculation section (Claims 1 and 14) for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus; a heating control section (Claim 11 – regeneration treatment) for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than a reference accumulation amount; and a hold control section (Claim 11) for holding the estimated accumulation amount when the estimated accumulation amount falls within a hold determination reference range due to the heating and the at least one difference is greater than a held reference value.

10. With regards to claim 12, Ono discloses the regeneration controller of claim 10, as described above, and further wherein the hold determination reference range includes a value equal to the accumulation amount of particulate matter in the exhaust purification apparatus immediately before the heating is completed (Claim 11 – immediately after and immediately before are the same point in time).

11. With regards to claim 13, Ono discloses the regeneration controller of claim 10, as described above, and further wherein when a state in which the at least one difference is greater than the held reference value continues and a period in which the estimated accumulation amount is held reaches a stop determination period, the hold control section does not further hold the estimated accumulation amount ().

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12. With regards to claim 14, Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification portion (Fig. 9, No. 6 – upstream end) and a downstream purification portion (Fig. 9, No. 6 – downstream end), the regeneration controller comprising: a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure, between a first location upstream from the exhaust purification apparatus (Fig. 9, No. 35) and a second location downstream from the exhaust purification apparatus (Fig. 9, No. 36), and a difference in exhaust temperature, between a third location upstream from the downstream purification portion of the exhaust purification apparatus and a fourth location downstream from the third location; a calculation section (Claims 1 and 14) for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus; a heating control section (Claim 11 – regeneration treatment) for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than particulate accumulation amount; and a particulate matter elimination continuation control section (Claim 7) for continuing the heating until the at least one difference is reduced to be smaller than a continuance reference value when the estimated accumulation amount reaches a reference value for completing the heating and the at least one difference is greater than the continuance reference value.

13. With regards to claim 15, Ono discloses a regeneration controller for regenerating an exhaust purification apparatus (Fig. 9, No. 6) that is arranged in an exhaust passage for an internal combustion engine, wherein the exhaust purification apparatus includes an upstream purification mechanism (Fig. 9, No. 6 – upstream end) and a downstream purification mechanism (Fig. 9, No. 6 – downstream end) that are arranged continuously in the exhaust passage, the regeneration controller comprising: a difference detector (Claim 14) for detecting at least one of a difference in exhaust pressure and a difference in exhaust temperature between an upstream location (Fig. 9, No. 35) and a downstream location (Fig. 9, No. 36) of the downstream purification mechanism; a calculation section (Claims 1 and 14) for calculating an estimated accumulation amount of particulate matter in the exhaust purification apparatus; a heating control section (Claim 11 – regeneration treatment) for heating the exhaust purification apparatus to eliminate the particulate matter from the exhaust purification apparatus when the estimated accumulation amount is greater than a reference accumulation amount; and a particulate matter elimination continuation control section (Claim 7) for continuing the heating until the at least one difference is reduced to be smaller than a continuance reference value when the estimated accumulation amount reaches a reference value for completing the heating and the at least one difference is greater than the continuance reference value.

14. With regards to claim 20, Ono discloses an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the replacement control section of claim 1, as described above.

15. With regards to claim 21, Ono discloses an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the replacement control section of claim 10, as described above.

16. With regards to claim 22, Ono an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the replacement control section of claim 14, as described above.

17. With regards to claim 26, Ono discloses the regeneration controller of claim 2, as described above, and further wherein the replacement determination reference range includes a value equal to the accumulation amount of particulate matter in the exhaust purification apparatus immediately before the heating is completed (Claim 11 – immediately after and immediately before are the same point in time).

18. With regards to claim 27, Ono discloses the regeneration controller of claim 2, as described above, and further wherein a maximum value of the replacement determination reference range is equal to the accumulation amount of particulate matter in the exhaust purification apparatus when the heating is completed (Claim 11).

19. With regards to claim 35, Ono discloses the regeneration controller of claim 2, as described above, and further wherein there is an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the replacement control section.

20. With regards to claim 37, Ono discloses the regeneration controller of claim 11, as described above, and further wherein the hold determination reference range includes a value equal to the accumulation amount of particulate matter in the exhaust

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purification apparatus immediately before the heating is completed (Claim 11 – immediately after and immediately before are the same point in time).

21. With regards to claim 39, Ono discloses the regeneration controller of claim 11, as described above, and further wherein there is an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the hold control section.

22. With regards to claim 43, Ono discloses the regeneration controller of claim 15, as described above, and further wherein there is an electronic control unit (Fig. 9, No. 20') serving as the calculation section, the heating control section, and the continuation control section.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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25. Claims 17, 18, 23, 24, 33, 34, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono in view of Deeba (U.S. 6,912,847). Ono discloses the regeneration controller of claims 1, 2, 14, and 15, as described above, but fails to specifically describe wherein there is a NOx storage reduction catalyst upstream of a combination NOx storage reduction catalyst over a particulate filter base. Deeba discloses an exhaust aftertreatment system that teaches to place an NOx storage reduction catalyst (Deeba; Fig. 3, No. 14) upstream of a combination particulate filter/NOx storage reduction catalyst (Deeba; Fig. 3, No. 15; Col. 9, Line 45 – Col. 10, Line 29). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the particulate filter assembly (Deeba; Fig. 3, No. 11) of Deeba in the system of Ono for the advantage of improved NOx emission reduction (Deeba; Abstract).

Allowable Subject Matter

26. Claims 5-9, 13, 16, 19, 25, 28-32, 36, 38, and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LOREN C. EDWARDS whose telephone number is (571)272-2756. The examiner can normally be reached on M-TH 5:30-4.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas E. Denion/
Supervisory Patent Examiner, Art Unit 3748

/Loren Edwards/
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